

US-PAT-NO: 6507668

DOCUMENT-IDENTIFIER: US 6507668 B1

TITLE: Image enhancing apparatus  
and method of maintaining  
brightness of input image

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INVENTOR-INFORMATION:

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APPL-DATE	APPL-NO
KR	98-55038
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US-CL-CURRENT: 382/169, 358/463 , 358/518 ,  
358/522 , 382/167 , 382/170  
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ABSTRACT:

An image enhancing apparatus is provided and includes a histogram equalizer and a compensating circuit. The histogram equalizer equalizes an input image, which is expressed by a predetermined number of

gray levels, and outputs a corresponding equalized output image. The compensating circuit determines an input mean value corresponding to the input image and an output mean value corresponding to the output image and calculates a mean difference based on the input and output mean values. Then, the compensating circuit adjusts the equalized output image based on the mean difference to prevent a reduction in the mean brightness of the equalized output image. As a result, a reduction in the mean brightness of a light screen can be avoided and any deterioration of the output signal caused by the histogram equalization can be prevented to provide a stable image display. In-addition, a method performed by the apparatus is also provided.

19 Claims, 4 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 3

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Abstract Text - ABTX (1):

An image enhancing apparatus is provided and includes a histogram equalizer and a compensating circuit. The histogram equalizer equalizes an input image, which is expressed by a predetermined number of gray levels, and outputs a corresponding equalized output image. The compensating circuit determines an input mean value corresponding to the input image

and an output mean value corresponding to the output image and calculates a mean difference based on the input and output mean values. Then, the compensating circuit adjusts the equalized output image based on the mean difference to prevent a reduction in the mean brightness of the equalized output image. As a result, a reduction in the mean brightness of a light screen can be avoided and any deterioration of the output signal caused by the histogram equalization can be prevented to provide a stable image display. In-addition, a method performed by the apparatus is also provided.

#### Brief Summary Text - BSTX (14):

However, a serious problem arises when the histogram equalization operation is performed by the apparatus in FIG. 1. Specifically, since the cumulative density function is directly used as a mapping function to change the distribution of the gray levels of the input image, the mean brightness of the output image may substantially change based on the cumulative density function. In particular, the mean brightness of an image signal, which has been equalized such that the distribution of gray levels is uniform, converges on the middle gray level within the gray level range regardless of the brightness of the input image. Accordingly, when a bright image having a small number of pixels with dark gray levels is displayed on a bright screen, the image is slightly darkened, and thus, the quality of the image is degraded. Consequently, the

histogram equalization operation performed by the apparatus is only used when a relatively dark image is displayed on dark screen. Thus, the histogram equalization operation performed by the apparatus is not used in a television or camcorder.

Current US Original Classification - CCOR (1):  
382/169